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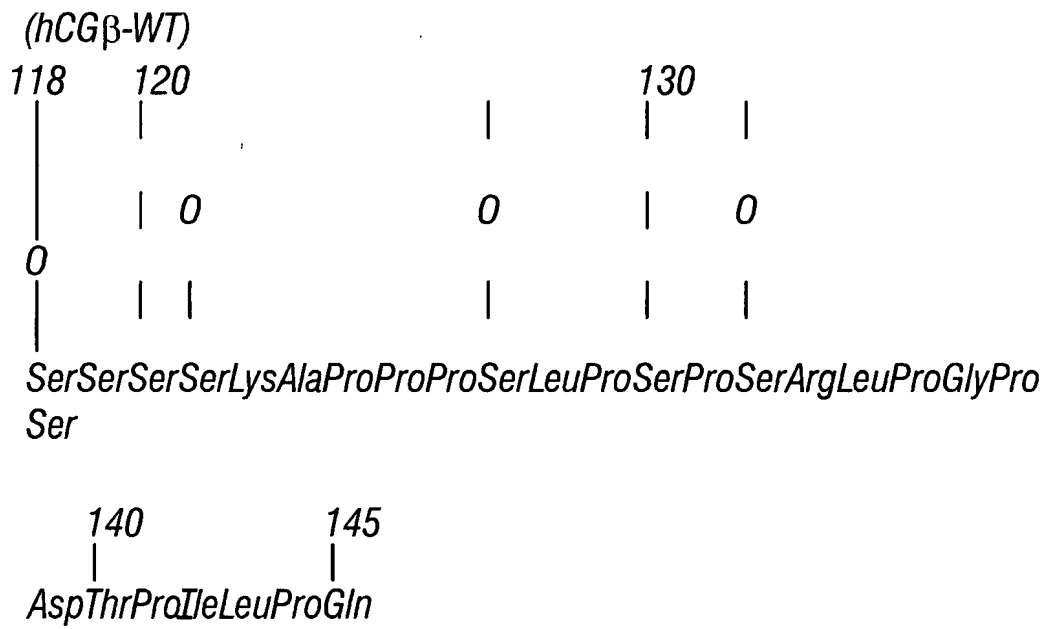


FIG. 2

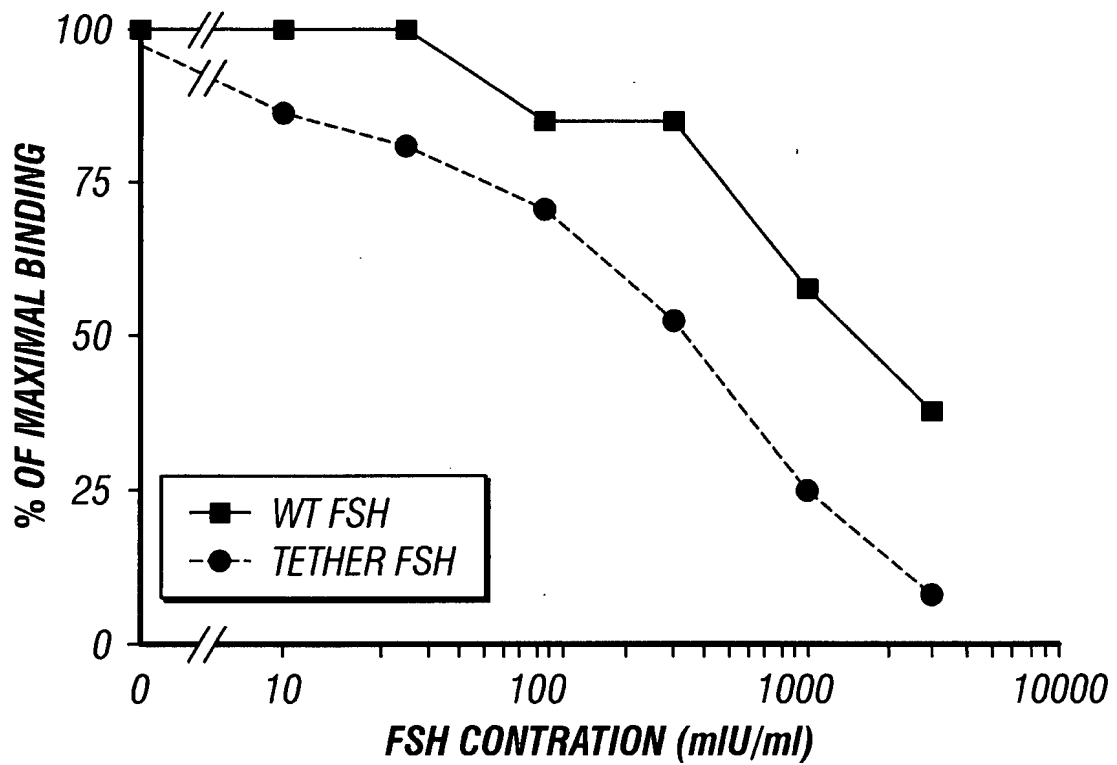


FIG. 3

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D S S S K A P P S L P S P S R L P G P S D T P I L P Q G S G S G S
 GACTCCTTCTCAAGGCCCTCCCCAGCCTTCCAAGCCATCCGACTCCGGGCCCTCGACACCCCGATCCTCCCAAGGATCCGGTAGCGGATCTGGTAGC-
 CTGAGGAGAAGGAGTTCCGGGAGGGGGTCCGAAGGTTCCGGTAGGGCTGAGGGCCCCGGGAGCCTGTGGGGCTAGGAGGGGTTCTAGGCCATCGCCTAGACCAATCG-
 gggccc (ApaI) ggatcc (BamHI) agc

A P D V Q D C P E C T L Q E N P F F S Q P G A P I L Q C M G C C F S R A Y
 GCTCCTGATGCGAGGATTGCCAGATGCACGCTACAGGAAACCCATTCTTCTCCAGCCGGTGCCCAATACTTCAGTGCAATGGGTGCTGCTTCTCTAGAGCATAT-
 CGAGGACTACACGTCCTAACGGGTCTTACGTGGGATGTCCTTTGGTAAGAAGAGGTCCGGCCACGGGGTTATGAAGTCAGTACCGACGACGACGAGATCTCGTATA-
 gct (Eco47III)

P T P L R S K K T M L V Q K N V T S E S T C C V A K S Y N R V T V M G G F
 CCCACTCCACTAAGTCCAAAGACGATGTTGGTCCAAAGAACGTCACCTCAGAGTCCACTTGTGTAGCTAAATCATATAACAGGTCACAGTAATGGGGGTTTC-
 GGTGAGGTGATTCAGGTTCTTCTGCTACAACGAGTTTCTTGCAGTGGAGTCTCAGGTGAACGACACATCGATTTAGTATATTGTCCTAGTGCATTACCCCCCAAG-

K V E N H T A C H C S T C Y Y H K S *

AAAGTGGAGAACCACGGCGTCCACTGCAGTACTTGTATTATCACAATCTTAAGGTACC-3'

TTTCACCTCTTGGTGTGCCGCACGGTGACGTCATGAACAATAATAGTGTTAGAATTCATGGCCTAGGTAGAGTTCGATTAGGCCCT-5'

(KpnI) ggtaccggatcc (BglII)

FIG. 5B

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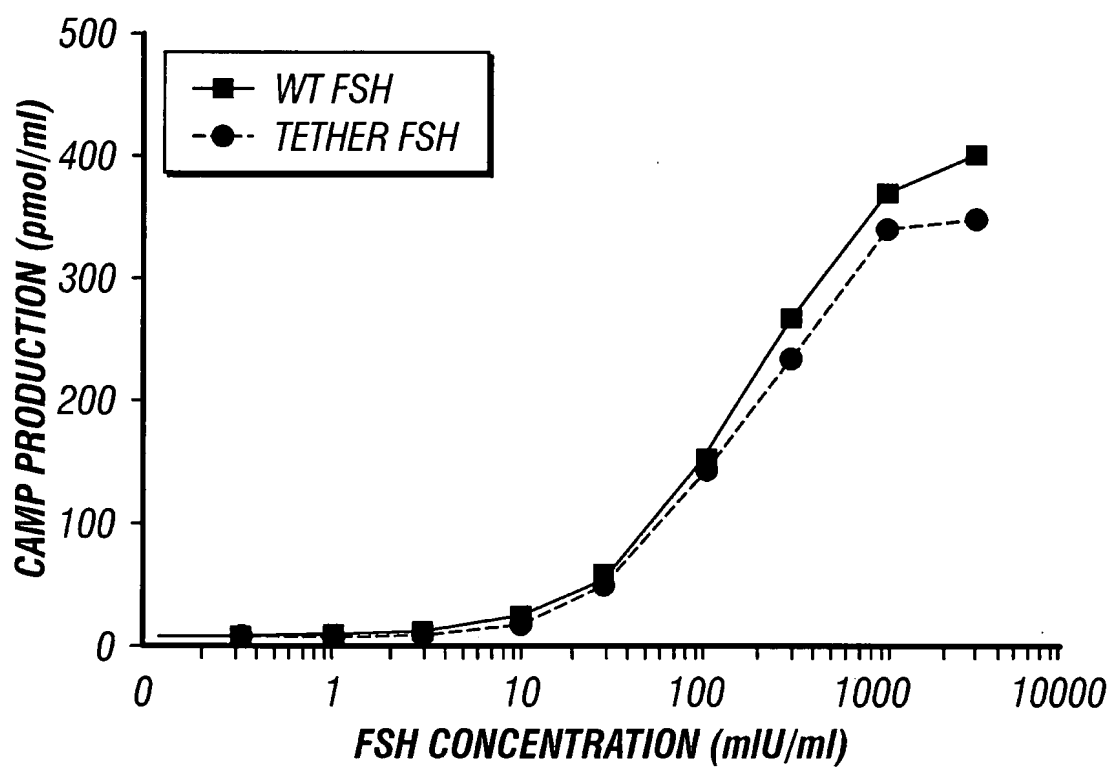


FIG. 4

Coding Sequence for Single Chain Gonadotropin Analog #1 and Primers (underlined)

5' - ATGAAATCGACCGAATCAGACTCGAGCCAAAGATGGAGATGTTCCAGGGGCTGCTCTGTTGCTGCTGCTGACATGGCGGGACATGGGCATCCAAAGGAGCCGCTT-
M E M F Q G L L L L L L L S M G G T W A S K E P L
3' - GGTTCCTACTCTACAA GGTCCCCGACGACCAACGACGACTGTA CCGCTAGGTTCTCTGGCGCAA -
ctcgag (XhoI)

R P R C R P I N A T L A V E K E G C P V C I T V N T I C A G Y C P T M T
CGGCCACGGTGCCGCCCCATCAATGCCACCCCTGGCTGTGGAGAAGGAGGGTGCCCCGTGTCATCACCGTCAACACCACCATCTGTGCCGGGTACTGCCCCACCATGACC-
GCCGGTGCCACGGCGGGGTAGTTACGGTGGGACCGACACCTCTTCTCCGACGGGGCACACGTATGGCAGTTTGTGGTAGACACGGGCCCATGACGGGTGGATCTGG-

R V L Q G V L R A L P Q V V C N Y R D V R F E S I R L P G C P R G V N P V
CGCGTCTGCAGGGGGTCCCTGCCGGCCCTGCAGGTGGTGTGCACTACCGCATGTGCGCTTCGAGTCCATCCGGCTCCCTGGCTGCCCGCGCGGCGTGAACCCCGTGCAGCACGAGTCCCCCAGGACGGCCGGGACGGAGTCCACCACAGTTGATGGCGCTACACGCCAAGCTCAGGTAGGCCCGAGGACCCGACGGCGCGCGCCGCACTTGGGGCAC-cctnagg (MstII)

V S Y A V A L S C Q C A L C R S T T D C G P K D H P L T C D D P R F Q
GTCTCTACGCCGTGGCTCTCAGCTGTCAATGTGCACTCTGCCGCCGACGACCACTGACTGGGGGGTCCAAAGACCACTTGAACCTGTGATGACCCCCCGCTTCCAG-
CAGAGGATCGCGGACCCGACAGTCGACAGTTACACGTGAGACGGCGGGCGTCTGGTGGTGACTGACGCCCCCAAGGTTTCTGGTGGGAACTGGACACTACTGGGGCGCAAGGTC-

FIG. 5A

(underlined)

MEMEFOGLLLLSMGGTWSKEPL

3'-GGTTCCTACCTCTCAAGTCCCGACGACGACAACGACGACTCGTACCCGCCCTGTACCCGTTAGGTTCTCTGGCGAA-

R P R C R P I N A T L A V E K E G C P V C I T V N T T I C A G Y C P T M T

RVLLQGVLLRALLPQVVVCNYYRRDVRFEESIRLLPGCPRGVNPPV

V S Y A V A L S C O C A L C R R S T T D C G G P K D H P L T C D D P R G S

FIG. 6A

G S G S G S A P D V Q D C P E C T L Q E N P F F S Q P G A P I L Q C M G C
 GGTAGCGGATCTGGTAGCGCTCCTGATGTGCAGGATTGCCAGAAATGCACGCTACAGGAAACCCCAATTCTTCTCCAGCCGGTGCCCCAATACTTCAGTGCATGGGCTGC-
 CCATCGCCCTAGACCATCGCGAGGACTACACGTCCCTAACGGGTCTTACGTGCGATGTCCTTTTGGTAAGAAGAGGGTCCGCCACCGGGTTATGAAGTCACGTACCCCGACG-
 agcgct(Eco47III)

C F S R A Y P T P L R S K K T M L V Q K N V T S E S T C C V A K S Y N R V
 TGCTTCTCTAGAGCATATCCCACTCCACTAAGTCCAAGACGATGGTCCAAAAGAACGTCACCTCAGAGTCCACTTGCTGTAGCTAAATCATATAACAGGGTC-
 ACGAAGAGATCTCGIATAGGTGAGGTGATCCAGGTTCTTCTGCTACAAACCAGGTTTCTTGCAGTGGAGTCTCAGGTGAACGACACATCGATTAGTATATTGTCCCAG-

T V M G G F K V E N H T A C H C S T C Y Y H K S *
 ACAGTAATGGGGGTTTCAAAGTGGAGAACACACGGCGTGCCACTGCAGTACTTGTATTATATCACAATCTTAAGGTACC-3'
 TGTCAATACCCCCCAAAGTTTCACCTCTTGGTGTGCCGCACGGTGACGTCATGAACAATAATAGTGTTTAGAAATCCATGG-5'
 ggtacc(KpnI)

FIG. 6B

Coding Sequence for Single Chain Gonadotropin Analog #3 and Primers (underlined)

5'-ATGAATCGACCGAATCAGACTCGAGCCAAGGAATGGAGATGCTCCAGGGGCTGCTGCTGCTGCTGAGCATGGCGGGGGCATGGGCATCCAGGGAGCCGCTT-
 M E M L Q G L L L L L L L L S M G A W A S R E P L
 3'-GGTTCCCTTACCTTACGAGGTCCCCGACGACGACGACGACTCGTACCCGCCCGTACCCGTAAGTCCCTCGGCGAA-
 ctcgag (XhoI)

R P W C H P I N A I L A V E K E G C P V C I T V N T T I C A G Y C P T M M
 CGGCCATGGTGGCACCCTCAATGCCATCCTGGCTGTGGAGAAGAGGGCTGCCCGGTGTGCATCACCGTCAACACCACCATCTGTGCCGGCTACTGCCCCACCATGATG-
 GCCGGTACCACGGTGGGGATGTTACGGTAGGACCGACACCTCTTCCCTCCGACGGGGCACACGTAAGTGGCAGTTGTGGTGTAGACACGGGCGGATGACGGGGTGGTACTAC-

R V L Q A V L P P L P Q V V C T Y R D V R F E S I R L P G C P R G V D P V
 CGCGTGTGAGGGCGGTCCCTGCCGCCCTGCCTCAGGTGGTGTGCACCTACCGTGTGCGGCTTCGAGTCCATCCGGCTCCCTGGCTGCCCGCGTGGCGTGGACCCCGTG-
 GCGCACGACGTCCCGCAGGACGGAGTCCACACACGTGGATGGCACTACACGCGAAGCTCAGTAGGCCGAGGACCGACGGGCGCACCCGACCTGGGGGCAC-
 cctnagg (MstII)

V S F P V A L S C R C G P C R R S T S D C G G P K D H P L T C D H P Q G S
 GTCTCCTTCCCTGTGGCTCTCAGCTGTGGACCCCTGCCCGCCGACACCTCTGACTGTGGGGGTCCCAAGACCACCCCTTGACCTGTGACCACCCCAAGGATCC-
 CAGAGGAAGGACACCGAGTCGACAGCGACACCTGGGACGGCGCGCTCGTGGAGACTGACACCCCGAGGGTTTCTGGTGGGAACTGGACACTGCTGGGGGTTCTTAGG-
 (BamHI)ggatcc

FIG. 7A

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G S G S G S A P D V Q D C P E C T L Q E N P F F S Q P G A P I L Q C M G C
GGTAGCGGATCTGGTAGCGCTCCTGATGTGCAGGATTGCCAGAAATGCACGCTACAGGAAACCCCACTTCTCCAGCCGGGTGCCCAATACTTCAGTGCATGGGCTGC-
CCATCGCCCTAGACCATCGCGAGGACTACACGTCCTTAACGGGTCTTACGTCCGATGTCCTTTTGGTAAGAAGAGGGTCGGCCACCGGGGTTATGAAGTCACGTACCCGACG-
agcgct (Eco47III)

C F S R A Y P T P L R S K K T M L V Q K N V T S E S T C C V A K S Y N R V
TGCTTCTTAGAGCATATCCCACTCCACTAAGTCCAAGACGATGTTGGTCCAAAAGAACGTCACCTCAGAGTCCACTTGCTGTGTAGCTAAATCATATAACAGGGTC-
ACGAAGAGATCTCGTATAGGTGAGGTGATTCAGGTTCTTCTGCTACAACCAAGGTTTCTTGCAGTGGAGTCTCAGGTGAACGACACATCGATTAGTATATTGTCCCAG-

T V M G G F K V E N H T A C H C S T C Y Y H K S *
ACAGTAATGGGGGTTCAAAGTGGAGAACCCACACGGCGTGCCACTGCAGTACTTGTATTATATCACAATCTTAAGGTACC-3'
TGTCATTACCCCCCAAAGTTTCACCTCTTGGTGTGCGCGCACGGTGACGTCATGAACAATAATAGTGTTTAGAAATCCCATGG-5'
ggtacc (KpnI)

FIG. 7B

Coding Sequence for Single Chain Gonadotropin Analog 4 and Primers (underlined)

5'-ATGAAATCGACCGAATCAGACTCGAGCCCAAGGATGAAGACACTCCAGTTCCTTCCTTTCTGTTGCTGGAAAGCAATCTGCTGCAATAGCTGTGAGCTGACCAAC-

3'-GGTTCCTACTCTGTGAGGTCAAAAAGAGAAAGCAACGACCTTTCGTTAGCAGCGTATCGACACTCGACTGGTTG-
ctcgag (XhoI)

I T I A I E K E E C R F C I S I N T T W C A G Y C Y T R D L V Y K D P A R
ATCACCATTGCAATAGAGAAAGAAGTGTGCTTCTGCAATAGCATCAACACCATTGGTGTGCTGGTACTGCTACACCAGGGATCTGGTGTATATAAGGACCCAGCCAGG-
TAGTGGTAACGTTATCTCTTCTTACAGCAAAGACGTAGGCGTAGTTGTGGTGAACCAACACGACCGATGACGATGTGGTCCCTAGACCACATATTCCTGGGTCGGTCC-

P K I Q K T C T F K E L V Y E T V R V P G C A H H A D S L Y T Y P V A T Q
CCCCAAATCCAGAAACATGTACCTTCAAGGAAGTGGTATATGAAACAGTGAGAGTGCCCGGCTGTGCTACCATGCAGATTCCCTTGTATACATACCCAGTGGCCACCCAG-
GGTTTTAGGTCCTTGTACATGGAAGTTCCTTGACCAATATCTTGTCACTCTCACGGGGCCGACACGAGTGGTACGCTCTAAGGAACATATGTATGGGTCACCCGGTGGGTC-
tgggcca (Bali)

C H C G K C D S D S T D C T V R G L G P S Y C S F G E M K E G S G S G
TGTCACCTGTGGCAAGTGTACAGCGACAGCACTGATTGTACTGTGCGAGGCCCTGGGGCCAGCTACTGCTCCTTTGGTGAAATGAAAGAAGGATCCGGTAGCGGATCTGGT-
ACAGTGACACCGTTACACTGTGCTGTGCTGACTAACAATGACACCGCTCCGGACCCCGGGTGGTGGATGACGAGGAAACCACTTTACTTTCTCCTAGGCCATCGCCTAGACCA-
gggccc (ApaI) ggatcc (BamHI)

FIG. 8A

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S A P D V Q D C P E C T L Q E N P F F S Q P G A P I L Q C M G C C F S R A
AGCGTCTCGATGTCAGGATTGCCCAGAAATGCACGCTACAGGAAACCCATTCTTCTCCAGCCGGGTGCCCAATACTTCAGTGCATGGGCTGCTTCTCTAGAGCA-
TCGCGAGGACTACACGTCCTAACGGGTCTTACGTCCGATGTCCTTTTGGGTAAAGAGGGTCGGCCACGGGGTTATGAAGTCACGTACCCGACGACGAAAGAGATCTCGT-
agcgct(Eco47III)

Y P T P L R S K K T M L V Q K N V T S E S T C C V A K S Y N R V T V M G G
TATCCCACTCCACTAAGTCCAAAGAACGATGTTGGTCCAAAGAACGTCACTCAGAGTCCACTTGGCTGTGTAGCTAAATCATATAACAGGTCACAGTAATGGGGGT-
ATAGGGTGAGGTGATCCAGGTCTTCTGCTACAACCAGGTTTCTTCCAGTGGAGTCTCAGGTGAACGACACATCGATTAGTATATTGTCCTCCAGTGTCAATACCCCCCA-

F K V E N H T A C H C S T C Y Y H K S *

TTCAAAGTGGAGAACACACGGCGTGCCACTGCAGTACTTGTATTATCACAAATCTTAAGGTACC-3'

AAGTTTCACCTCTTGGTGTGCCGCACGGTGACGTCATGAACAATAATAGTGTTTAGAATTCCATGG-5'

ggtacc(KpnI)

FIG. 8B

5' -ATGAATCGACCGAATCAGACTCCAGCCCAAGGATGGAGATGTTCCAGGGGCTGCTGCTTGTCTGCTGCTGAGCATGGCGGACATGGCATCCAAGGAGCGGCTT-
M E M F Q G L L L L L L L S M G G T W A S K E P L
3' -GGTTCTTACCTCTACAAGGTCCCCGACGACGACAACGACGACGACTGTACCCCGCCCTGTACCCGTAGGTTCTCTGGCGGAA-
ctcgag (XhoI)

R P R C R P I N A T L A V E K E G C P V C I T V N T T I C A G Y C P T M T
CGGCCACGGTGCCGCCCCCATCAATGCCACCTGGCTGTGGAGAAGAGGGCTGCCCGGTGCATCACCGTCAACACCAACCATCTGTGCCGGCTACTGCCCCACCATGACC-
GCCCGTGCCACGCGCGGGTAGTTACGGTGGGACCGACACCTCTTCTCTCCGACGGGGCACACGTAGTGGCAGTTGTGGTGGTAGACACGGCCCGATGACGGGGTGGATCTGG-

R V L Q G V L R A L P Q V V C N Y R D V R F E S I R L P G C P R G V N P V
CGCGTGTGAGAGGGGTCTGCCGGCCCTGCCTCAGGTGGTGTGCAACTACCGCGATGTGGGTTTCAGTCCATCCGGGTCCTGGCTGCCCGCGCGCGCGTGAACCCCGTG-
GGGCACGACGTCCCCCAGGACGGCCGGGACGGAGTCCACCACACAGTTGATGGCGCTACACGGCAAGCTCAGGTAGGCCGAGGGACCGACGGCGCGCGCGCACTTGGGGCAC-

V S Y A V A L S C Q C A L C D S D S T D C T V R G L G P S Y C S F G E M K
GTCTCCTACGCCGTGGCTCTCAGCTGTCAATGTGCACTCTCGACACCGACAGCACTGATTGTA
CTACTGTGCGAGGCCTGGGCCCCAGCTACTGCTCTTGGTGAATGAAA-
CAGAGGATCGGCACCGACAGTCGACAGTACCGTGAGACGCTGTCCTGTCTGCTGACTAACATGACACGCTCCGGACCCCGGGTCGATGACGAGGAAACCACTTTACTTT-
gggccc (ApaI)

FIG. 9A

E G S G S G S A P D V Q D C P E C T L Q E N P F F S Q P G A P I L Q C
 GAAGGATCCGGTAGCGATCTGGTAGCGCTCCTGATGTGCAGGATTGCCAGAAATGCACGCTACAGGAAACCCATTCTTCTCCAGCCGGTGCCCAATACTTCAGTGC-
CTTCCTAGGCCATCGCCTAGACCATCGCGAGGACTACACGTCCTAACGGGTCTTACGTGCGATGTCCTTTTGGGTAAGAAGAGGTCGGCCCCACGGGGTTATGAAGTCACG-
 ggtacc (BamHI) agcgct (Eco47III)

M G C C F S R A Y P T P L R S K K T M L V Q K N V T S E S T C C V A K S Y
 ATGGGCTGCTGCTCTCTAGAGCATATCCCACCTCCACTAAGTCCAAAGAAGACGATGTTGGTCCAAAGAACGTCACCTCAGAGTCCACTTGTGTGTAGCTAAATCATAT-
 TACCCGACGACGACAGATCTCGTATAGGGTGAGGTGATTCCAGGTCTTCTGCTACAACGAGTTTCTTGCAGTGGAGTCTCAGGTGAACGACACATCGATTTAGTATA-

N R V T V M G G F K V E N H T A C H C S T C Y Y H K S *
 AACAGGGTCACAGTAATGGGGGTTTCAAAGTGGAGAACACACGGCGTGCCACTGCAGTACTTGTATTATCACAATCTTAAGGTACC-3'
 TTGTCCCAGTGTCATTACCCCCCAAAGTTTCACCTCTTGGTGTGCCCGACGGTGACGTCATGAACAATAATAGTGTTTAGAAATTCATGG-5'
 ggtacc (KpnI)

FIG. 9B

(underlined)

[illegible]

R P R C R P I N A T L A V E K E G C P V C I T V N T T I C A G Y C P T M T
CGGCCACGGTGCCGCCCCCATCAATGCCACCTGGCTGTGGAGAAGGAGGGCTGCCCCCGTGTGCATCACCGTCAACACCAACCATCTGTCCCGGTACTGCCCCACCATGACC-
GCCGGTGCACAGCGCGGGGTAGTTACGGTGGACACCGACACCTCTTCCCTCCGACCGGGGCACACGTAGTGGCAGTTGTGGTGGTAGACACGGCCCGATGACGGGGTGGATCTGG-

R V L Q G V L R A L P Q V V C N Y R D V R F E S I R L P G C P R G V N P V
CGCGTGTGCAGGGGGTCCCTGCCGGCCCTGCCTCAGGTGGTGTGCAACTACCGCGATGTGCGCTTCGAGTCCATCCGGCTCCCTGGCTGCCCGCGCGGCGGTGAACCCCGTG-
GGCACGACGTCCCCAGGACGGCCGGGACGGAGTCCACCACACGTTGATGGCGCTACACGCGAAGCTCAGGTAGGCCGAGGACCGACGGGCGCGCGCACTTGGGGCAC-
cctnagg (MstII)

V S Y A V A L S C Q C A L C R R S T T D C T V R G L G P S Y C S F G E M K
GTCTCTACGCCGTGGCTCTCAGCTGTCAATGTCACTCTGCCGCCGAGCACCACCTGACTGCACCTGTCCGAGGCTGGGCCCAGCTACTGCTCTTGGTGAATGAAA-
CAGAGGATCGGCACCCGACAGTCGACGATACGTCGAGACGGCGGCGTGTGGTGTACTGACGTGACACGCTCCGAGCCCCCGGGTCCGATGACGAGGAACCACTTTACTTT-
ggggccc (ApaI)

FIG. 10A

E G S G S G S A P D V Q D C P E C T L Q E N P F F S Q P G A P I L Q C
 GAAGGATCCGGTAGCGGATCTGGTAGCGCTCCTGATGTGCAGGATTGCCAGAGATGCACGCTACAGGAAACCCATTCTTCCAGCCGGGTGCCCAATACTCAGTGC-
CTTCCTAGGCCCATCGCCTAGACCATCGCGAGGACTACACGTCCTAACGGGTCTTACGTGCGATGTCCTTTTGGGTAAGAAGAGGGTCGCCCCACGGGGTTATGAAGTCACG-
 ggtacc (BamHI) agcgct (Eco47III)

M G C C F S R A Y P T P L R S K K T M L V Q K N V T S E S T C C V A K S Y
 ATGGGCTGCTGCTTCTTAGAGCATATCCCACTCCACTAAGTCCAAGAAGACGATGTTGGTCCAAAAGAACGTCACCTCAGAGTCCACTTGTGTAGCTAAATCATAT-
 TACCCGACGACGAAGAGATCTCGTATAGGGTGAGGTGATTCCAGGTTCTTCTGCTACAACCAAGGTTTCTTGCAGTGGAGTCTCAGGTGAACGACACATCGATTAGTATA-

N R V T V M G G F K V E N H T A C H C S T C Y Y H K S *
 AACAGGGTCACAGTAATGGGGGTTTCAAAGTGGAGAACCCACACGGGTGCCACTGCAGTACTTGTATTATACAAATCTTAAGGTACC-3'
 TTGTCCCAGTGTCAATACCCCCCAAGTTTCACCTCTTGGTGTGCCGACGGTGACGTCATGAACAATAATAGTGTTAGAATTCATGG-5'
 ggtacc (KpnI)

FIG. 10B

Coding Sequence for Single Chain Gonadotropin Analog#7 and Primers

5' -ATGAAATCGACGGAAATCAGACTCGAGCCCAAGGATGGAGATGTTCCAGGGGCTGCTGTTGTTGCTGCTGAGCATGGCGGGGACATGGGCATCCAAGGAGCCGCTT-
M E M F Q G L L L L L L S M G T W A S K E P L
3' -GGTTCCTACCTCTACAAGGTCCCGCAGCAGCACACGACGACGACTCTGTAACCCGCCCTGTACCCGTAGGTTCTCTCGGCGAA-
ctcgaq (XhoI)

R P R C R P I N A T L A V E K E G C P V C I T V N T I C A G Y C P T M T
CGGCCACGGTGCCGCCCAATGCCACCCCTGGCTGTGGAGAAAGAGGGGCTGCCCCGTGTGCATCACCGTCAACACCACCATCTGTGCCGGGCTACTGCCCCACCATGACC-
GCCGGTGCCACGGCGGGGTAGTTACGGTGGGACCGACACCTCTTCCTCCCGACGGGGCACACGTAATGGCAGTTGTGGTGGTAGACACGGCCCGATGACGGGGGTGGATCTGG-

R V L Q G V L R A L P Q V V C N Y R D V R F E S I R L P G C P R G V N P V
CGCGTGCTGCAGGGGGTCTACCGGGCCCTCAGTGGTGTGCAACTACCGCGATGTGCGCTTCAGTCCATCCGGCTCCCTGGCTGCCCCGCGCGCGTGAACCCCGTG-
GCGCACGACGTCCCCAGGACGGCCGGACGGAGTCCACCACAGTTGATGGCGCTACACGCGAAGCTCAGGTAGGCCGAGGCGCGCGCGCACTTGGGGCAC-

V S Y A V A L S C Q C A L C R R S T T D C T V R G L G P S Y C S F G E G S
GTCTCTACGCCGTGGCTTCAGCTGTCAATGTGCACTCTGCCGCCGAGCACCACTGACTGCACTGTGCGAGGCCTGGGGCCAGCTACTGCTCTTTGGTGAAGGATCC-
CAGAGGATGCGGCACCGACAGTCGACAGTTACACGTGAGACGGGGCGTCTGGTGA CTGACACGCTCCGGACCCCGGTCGATGACGAGGAAACCACTTCCTCTAGG-
gggccc (ApaI) ggatcc (BamHI)

FIG. 11A

G S G S G S A P D V Q D C P E C T L Q E N P F F S Q P G A P I L Q C M G C
 GGTAGCGGATCTGTAGCGCTCCTGATGTGCAGGATTGCCAGAAATGCACGCTACAGGAAAACCCATTCTTCTCCACCCGGGTGCCCCAATACITTCAGTGCATGGGCTGC-
CCATCGCCTAGACCATCGCGAGGACTACACGTCCTAACGGGTCTTACGTCCGATGTCCTTTTGGGTAAGAAGAGGTGCGGCCACGGGGTTATGAAGTCACTACCCGACG-
 agcgct(Eco47III)

C F S R A Y P T P L R S K K T M L V Q K N V T S E S T C C V A K S Y N R V
 TGCTTCTCTAGAGCATATCCCACCTCCACTAAGTCCAAAGACGATGTTGGTCCAAAAGAACGTCACTCAGAGTCCACTTGCTGTAGCTAAATCATATAACAGGGTC-
 ACCAAGAGATCTCGTATAGGGTGAGGTGATTCACGGTTCTTCTGCTACAACCCAGGTTTCTTGCAGTGGAGTCTCAGGTGAACGACACATCGATTAGTATATTGTCCCAG-

T V M G G F K V E N H T A C H C S T C Y Y H K S *
 ACAGTAATGGGGGTTTCAAAGTGGAGAACCCACACGGCGTGCCACTGCAGTACTTGTATTATCACAATCTTAAGGTACC-3'
 TGTCAATTACCCCCCAAAGTTTCACTCTTGGTGTGCGCGACGGTGACGTCATGAACAATAATAGTGTTTAGAAATTCATGG-5'
 ggtacc(KpnI)

FIG. 11B

Coding Sequence for Single Chain Gonadotropin Analog #8 and Primers (underlined)

M E M F Q G L L L L L L L S M G T W A S K E P L
 5' -ATGAAATCGACGGGAATCAGACTCGAGCCAAGGATGGAGATGTTCCAGGGGCTGCTGCTGTTGCTGCTGCTGAGCATGGGCGGACATGGGCATCCAAGGAGCCGCTT-
 3' -GGTTCCTACCTCTACAAGTCCCGACGACGACAACGACGACGACTCGTACCCGCCCTGTACCCGTAAGTTCTTCGGCGAA-
 ctcgag (XhoI)

R P R C R P I N A T L A V E K E G C P V C I T V N T T I C A G Y C P T M T
 CGGCCACGGTGGCGGCCCATCAATGCCACCCCTGGCTGTGGAGAGAGGGCTGCCCGTGTGCATCACCGTCAACACCACTACTGTGCCGGCTACTGCCCCACCATGACC-
 GCCGTGCCACGGCGGGTAGTTACGGTGGGACCGACACCTCTTCCTCCCGACGGGGCACACGTAGTGGCAGTTGTGGTGGTAGACACGGGCCGATGACGGGGTGGATCTGG-

R V L Q G V L R A L P Q V V C N Y R D V R F E S I R L P G C P R G V N P V
 CGCGTCTGCAGGGGTCCTGCCGGCCCTGCCTCAGGTGGTGTGCAACTACCGCGATGTGCGCTTCAGTCCATCCGGCTCCCTGGCTGCCCGCGCGGGGTGAACCCCGTG-
 GCGACGACGTCCCCCAGGACGGCGGACGAGTCCACCACGTTGATGGCGCTACACGCGAAGCTCAGGTAGGCCGAGGACCGACGGCGCGCGCCGCACTTGGGGCAC-
 cctnagg (MstII)

V S Y A V A L S C Q C A L C R R S T T D C T V R G L G P S Y C D D P R G S
 GTCTCTACGGCGTGGCTCTCAGCTGTCAATGTGCACTCTGCCGCGCGCAGCACCACTGACTGCACCTGTGCGAGGCCCTGGGGCCCCAGCTACTGCCATGACCCCGGGGATCC-
 CAGAGGATGGGCACCGACAGTCGACAGTTACACGTGAGACGGCGGGCTCGTGGTACTGACGTGACACGCTCCGGACCCCGGGTCCGATGACGCTACTGGGCGCCCCCTAGG-
 gggccc (ApaI) (SstII) ccgcggggatcc (BamHI)

FIG. 12A

Coding Sequence for Single Chain Gonadotropin Analog 9 and Cassette (underlined)

5' -ATGAAATCGACGGAATCAGACTCGAGCCCAAGGATGAAGACACACTCCAGTTTTCTTCTTCTGTTGCTGGAAGCAATCTGCTGCAATAGCTGTGAGCTGACCAAC-
 3' -GGTTCCTACTTCTGTGAGTCAAAAAGAGAAAGACAACGACCTTTCGTTAGACGACGTTATCGACACACTCGACTGGTTG-
 ctcgag (XhoI)

I T I A I E K E E C R F C I S I N T T W C A G Y C Y T R D L V Y K D P A R
 ATCACCATTGCAATAGAGAAAAGAATGTCGTTTCTGCATAAGCATCAACACCATTGGTGTGCTGGCTACTGCTACACCAGGGATCTGGTGATATAAGGACCCAGCAGG-
 TAGTGGTAACGTTATCTCTTTCTTACAGCAAAGACGTAGGCGTACTTGTGTGAACCAACACGACCGATGACGATGTGCTCCCTAGACCACATATTCCTGGGTCGGTCC-

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P K I Q K T C T F K E L V Y E T V R V P G C A H H A D S L Y T Y P V A T Q
 CCCAAAATCCAGAAAACATGTACCTTCAAGGAACCTGGTATATGAACAGTGAGAGTGCCCGGCTGTGCTCACCATGCCAGATTCCCTGTATACATACCCAGTGGCCACCCAG-
 GGGTTTTAGGTCCTTGTACATGGAAGTTCCTTGACCATAFACCTTGTCACTCTCACGGGCCGACACGAGTGGTACGCTCTAAGGAACATATGTATGGGTACCCGGTGGGTC-
 tggcca (Bali)

C H C G K C D S D S T D C T V R G L G P S Y C S F G E G S G S G S A P
 TGTCACTGTGGCAAGTGTACAGCGACAGCACTGATTGTACTGTGGAGGCCCTGGGGCCCAGCTACTGCTCCTTTGGTGAAGGATCCGGTAGCCGATCTGGTAGCGCTCCT-
 ACAGTGACACCGTTCACTGTGCTGTGCTGACTAACATGACACCGTCCGGACCCCGGGTCGATGACGAGGAACCACTTCTTAGGCCATCGCCTAGACCATCGCGAGGA-
 gggccc (ApaI) (BamHI) ggatcc agcgct (Eco47III)

FIG. 13A

D V Q D C P E C T L Q E N P F F S Q P G A P I L Q C M G C C F S R A Y P T
GATGTG CAGGATTGCCAGAAATGCACGCTACAGGAAACCCATTCTTCCAGCCGGGTGCCCAATACTCAGTGCATGGGCTGCTTCTCTAGACATATCCCACCT-
CTACACGTCCTAACGGGCTTACGTCCGATGTCCTTTGGGTAAGAAAGAGGTCCGCCACGGGGTTATGAAGTCACGTACCCGACGACGAAGAGATCTCGTATAGGGTGA-

P L R S K K T M L V Q K N V T S E S T C C V A K S Y N R V T V M G G F K V
CCACTAAGGTCCAAGAAGACGATGTTGGTCCAAAAGAACGTCACCTCAGTCCACTTGTGTAGCTAATCATATAACAGGGTCACAGTAATGGGGGTTTCAAAGTG-
GGTGATTCACAGGTTCTTCTGGTACAAACAGGTTTCTTGCAGTGGAGTCTCAGGTGAACGACACATCGATTAGTATATTTGCCAGTGTCAATACCCCCCAAAGTTTCAC-

E N H T A C H C S T C Y Y H K S *

GAGAACCAACGGCGTGCCACTGCAGTACTTGTATTATCACAATCTTAAGGTACC-3'

CTCTTGGTGTGCCGACGGTGACGTCAATGAACAATAATAGTGTAGCAATCCATGG-5'

ggtacc (KpnI)

FIG. 13B

Coding Sequence for Single Chain Gonadotropin Analog 10 and Cassette (underlined)

M K T L Q F F F L F C C W K A I C C N S C E L T N
 5' -ATGAAATCGACGGGAATCAGACTCGAGCCCAAGGATGAAGACACATCCAGTTTTCTTCTGTTGCTGGAAGCAATCTGCTGCAATAGCTGTGAGCTGACCAAC-
 3' -GGTTCCTACTTCTGTGAGGTCAAAAAGAAAGACAACGACCTTTCGTTAGACGACGTTATCGACACTCGACTGGTTG-
 ctcgag (XhoI)

I T I A I E K E E C R F C I S I N T T W C A G Y C Y T R D L V Y K D P A R
 ATCACCATTGCAATAGAGAAAGAAGATGTCGTTTCTGCATAAGCATCAACACCACTTGGTGTGCTGGCTACTGCTACACCAGGGATCTGGTGTAFAAGGACCCAGCCAGG-
 TAGTGGTAACGTTATCTCTTCTTTACAGCAAAGACGTAGGCGTAGTTGTGTAACCAACACGACCGATGACGATGTGCTCCCTAGACCACATATTCCTGGGTCGGTCC-

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P K I Q K T C T F K E L V Y E T V R V P G C A H H A D S L Y T Y P V A T Q
 CCCAAAATCCAGAAAACATGTACCTTCAAGGAACCTGGTATATGAACAGTGAGAGTGCCCGGCTGTGCTCACCATGCCAGATTCCTTGTATACATACCCAGTGGCCACCCAG-
 GGGTTTAGGTCTTTTGTACATGGAAGTTCCTTGACCATAATCTTGTCACTCTCACGGGCCGACACGAGTGGTACGCTTAAGGAACATATGTATGGGTACCCGGTGGGTC-
 tggcca (Bali)

C H C G K C D S D S T D C T V R G L G P S Y C G S G S G S A P D V Q D
 TGTCACCTGTGGCAAGTGTACAGCGACAGCACTGATTGTACTGTGCGAGGCCTGGGGCCCACTACTGCGGATCCGGTAGCGGATCTGGTAGCGCTCCTGATGTCCAGGAT-
 ACAGTGACACCGTTACACTGTGCTGTCGTGACTAACATGACACGCTCCGGACCCCGGGTTCGATGACGCCCTAGGCCATCGCCTAGACCATCGCGAGGACTACACGTCCTA-
 gggccc (ApaI) (BamHI) g gatcc agcgct (Eco47III)

FIG. 14A

C P E C T L Q E N P F F S Q P G A P I L Q C M G C C F S R A Y P T P L R S
TGCCCAGAAATGCACGTACAGGAACCCATTCTCTCCAGCCGGTGCCCCAATACTTCAGTGCATGGGCTGCTCTCTAGAGCATATFCCCACCTCCACTAAGGTCC-
ACGGGTCTTACGTGGCATGTCCTTTTGGTAAGAAGAGGGTCGGCCACGGGGTTATGAAGTCACGTACCGACGACGAAGAGATCTCGTATAGGTGAGGTGATTCAGG-

K K T M L V Q K N V T S E S T C C V A K S Y N R V T V M G G F K V E N H T
AAGAAGACGATGTTGGTCCAAAGAACGTACCTCAGAGTCCACTTCTGTGTAGCTAAATCATATAACAGGGTCACAGTAATGGGGGTTTCAAAGTGGAGAACACACG-
TTCTTCTGCTACAAACAGGTTTCTTGCA GTGGAGTCTCAGGTGAACGACACATCGATTAGTATATTGTCCAGTGTCAATACCCCCCAAAGTTTCACTCTTGGTGTGC-

A C H C S T C Y Y H K S *
GCGTGCCACTGCAGTACTTGTATTATATCACAATCTTAAGGTACC-3'
CGACGGTGACGTCATGAACAATAATAGTGTTTAGAATTCATGG-5'

ggtacc (KpnI)

FIG. 14B

Preparation of an alpha-subunit coding region lacking oligosaccharide signal sequences

C G S G S G S A P D V Q D C P E C T L Q E N P F F S Q P G A P I L Q C
 TGGGATCCGGTAGCGGATCTGGTAGCGCTCCTGATGTGCAGGATTGCCAGAAATGCACGCTACAGGAAAACCCATTCTTCTCCAGCCGGGTGCCCAATACTTCAGTGC-
 ACGCCTAGGCCATCGCCTAGACCATCGCGAGGACTACACGTCCTAACGGGTCTTACGTGCGATGTCCCTTTTGGGTAAGAAGAGGTGCGGCCACGGGGTTATGAAGTCACG-
 (BamHI)ggatcc agcgt(Eco47III)

M G C C F S R A Y P T P L R S K K T M L V Q K Q V T S E S T C C V A K S Y
 ATGGGCTGCTGCTCTCTAGAGCATATCCCACCTCCACTAAGGTCCAAGAGACGATGTTGGTCCAAAAGCAAGTCACCTCAGAGTCCACTTGTGTGTAGCTAAATCATAT-
 TACCCGACGACGAAGAGATCTCGTATAGGGTGAGGTGATCCAGGTCTTCTGCTACAACCAAGTTTTCGTGCAGTGGAGTCTCAGGTGAACGACACATCGATTAGTATA-
 tctaga(XbaI)

N R V T V M G G F K V E Q H T A C H C S T C Y Y H K S *
 AACAGGGTCACAGTAATGGGGGTTTCAAAGTGGAGCAACACACGGCGTGCCACTGCAGTACTTGTATTATATCACAATCTTAAGGTACC-3'
 TTGTCCCAGTGTCATTACCCCCCAAAGTTTCACCTCGTTGTGTGCCGACGGTGACGTCATGAACAATAATAGTGTTTAGAATTCCATGGCCATG-5'
 ggtacc(KpnI)

FIG. 15

Preparation of a beta-subunit coding region lacking asn-linked oligosaccharide signal sequences

5' -ATGAAATCGACCGAATCAGACTCGAGCCCAAGGATGGAGATGTTCCAGGGGCTGCTGCTGTTGCTGCTGAGCATGGCGGGGACATGGGCATCCAAGGAGCCGCTT-
M E M F Q G L L L L L L L S M G G T W A S K E P L
3' -GGTTCCTACCTCTACAAGGTCCCCGACGACGACAACGACGACGACTCGTACCCGCCCTGTACCCGTAGGTTCTCTGGCGAA-
ctcgag (XhoI)

R P R C R P I Q A T L A V E K E G C P V C I T V N T T I C A G Y C P T M T
CGGCCACGGTGGCGGCCCATCCAAGCCACCCTGGCTGTGGAGAAGAGGGCTGCCCGGTGTCATCACCGTCAACACCACCATCTGTGCCGGGTACTGCCCCACCATGACC-
GCCGGTGCCACGGCGGGTAGGTTCCGTGGGACCGACACCTCTTCTCCGACGGGGCACACGTAGTGGCAGTTGTGGTGTAGACACGGCGCGATGACGGGGTGGATCTGG-
R V L Q G V L R A L P Q V V C N Y R D V R F E S I R L P G C P R G V N P V
CGCGTGTGCAGGGGGTCTTGCCGGCCCTGCCTCAGGTGGTGTGCAACTACCGCGATGTGGCGTTCGAGTCCATCCGGCTCCCTGGCTGCCCGCGCGCGGTGAACCCCGTG-
GGCACGACGTCCCCCAGGACGGGAGTCCACCACACGTTGATGGCGCTACACCGGAAGCTCAGGTAGGCCGAGGACCGACGGGCGCGCGCGACTTGGGGCAC-
cctnagg (MstII)

FIG. 16A

V S Y A V A L S C Q C A L C R R S T T D C G G P K D H P L T C D D P R F Q
 GTCTCTACGCCGTGGCTCTCAGCTGTCAATGTGCACTCTGCCGCCGAGCACCACCTGACTCGGGGGTCCCAAGGACCACCCCTTGACCTGTGATGACCCCGCTTCCAG-
 CAGAGGATCGGGCACCGACAGTCGACAGTTACACGTGAGACGGCGCGCTCGTGGTGA CTGACGCCCCAGGGTTCTGTGGGAACTGGACACTACTGGGGGCGAAGGTC-
 D S S S K A P P S L P S P S R L P G P S D T P I L P Q G S G S G S
 GACTCCTCTTCTCAAAGGCCCTCCCCAGCCTTCCAAGCCATCCCGACTCCCGGGCCCTCGGACACCCCGATCTCCCCCAAGGATCCGGTAGCGGATCTGGTAGC-
 CTGAGGAGAAGGAGTTTCCGGGAGGGGGTCCGAAAGTTTCGGGTAGGGCTGAGGGCCCCGGGAGCCCTGTGGGGCTAGGAGGGGGTTCCTAGGCCATCGCCTAGACCATCG-
 gggccc (ApaI) ggatcc (BamHI) agc

A P D V Q D C P
GCTCCTGATGCGAGGATTGCCCCA
 CGAGGACTACACGTCCTAACGGGT
 gct (Eco47III)

FIG. 16B

Coding Sequence for Single Chain Gonadotropin Analog #1a

5' -ATGAAATCGACGGGAATCAGACTCGAGCCCAAGGATGGAGATGTTCCAGGGGCTGCTGCTGTTGCTGCTGAGCATGGCGGGGACATGGGCATCCAAGGAGCGGCTT-
 3' -GGTTCCTACCTCTACAAGGTCCTCCGACGACGACACAACGACGACGACTCGTACCGCCCTGTACCCGTAGGTTCTCTCGGCGAA-
 ctcgag (XhoI)

R P R C R P I N A T L A V E K E G C P V C I T V N T T I C A G Y C P T M T
 CGCCACGGTGGCGGCCCATCAATGCCACCCTGGCTGGAGAGGAGGGTGGCGGCTGTCATCACCGTCAACACCACTGTGCCGGCTACTGCCCCACCATGACC-
 GCCGGTGCCACGGCGGGGTAGTTACGGTGGGACCGACACCTCTTCTCCGACGGGGCACACGTAAGTGGCAGTTGTGGTGTAGACACGGCCGATGACGGGGTGGATCTGG-

R V L Q G V L R A L P Q V V C N Y R D V R F E S I R L P G C P R G V N P V
 CGCGTGTGCAGGGGGTCTGCCGGCCCTGCCTCAGGTGGTGTGCAACTACCGCGATGTGCGCTTCGAGTCCATCCGGCTCCCTGGCTGCCCGCGCGGTGAACCCCGTG-
 GCGCACGAGTCCCCCAGGACGGCGGACGGAGTCCACCACGTTGATGGCGCTACACGCGAAGCTCAGGTAGGCGGAGGACCGACGGCGCGCCGACACTTGGGGCAC-
 cctnagg (MstII)

V S Y A V A L S C Q C A L C R R S T T D C G G P K D H P L T C D D P R F Q
 GTCTCTACGCCGTGGCTCTCAGCTGTCAATGTGCACTGTGCCGGCGGACGACCACTGACTGCGGGGGTCCCAAGGACCAACCCCTTGACCTGTGATGACCCCGGCTTCCAG-
 CAGAGGATGCGGCACCGACAGTCGACAGTTACAGTGAGACGGCGGCGTCTGTGCTGACTGACGCCCCCAGGGTTCTGTGGGGAACTGGACACTACTGGGGGGCGAAGGTC-

FIG. 17A

D S S S K A P P P S L P S P S R L P G P S D T P I L P Q G S G S G S
 GACTCCTTCTCAAAGGCCCTCCCCAGCCTTCCAAGCCCATCCGACTCCGGGCCCTCGGACACCCCGATCCTCCCCAAGGATCCGGTAGCGATCTGGTAGC-
 CTGAGGAGAAGGAGTTTCCCGGAGGGGGTCCGAAGGTTCCGGTAGGGCTGAGGGCCCCCGGAGCCCTGTGGGCTAGGAGGGGGTTCTTAGGCCATCGCCTAGACCATCG-
 gggccc (ApaI) ggatcc (BamHI) agc

A P D V Q D C P E C T L Q E N P F F S Q P G A P I L Q C M G C C F S R A Y
GCTCCTGATGTCAGGATTGCCAGAAATGCACGCTACAGGAACCCCATTTCTCCAGCCGGTGCCCAATACCTCAGTGCATGGGCTGCTGCTTCTCTAGACATAT-
 CGAGGACTACACGTCCTAACGGGTCTTACGTCCGATGTCCTTTTGGGTAAAGAGAGGGTCCGGCCCCACGGGGTTATGAAGTCACGTACCCGACGACGAAGAGATCTCGTATA-
 gct (Eco47III)

P T P L R S K K T M L V Q K Q V T S E S T C C V A K S Y N R V T V M G G F
 CCCACTCCACTAAGTCCAAAGACCGATGTTGGTCCAAAGCAAGTCACCTCAGAGTCCACTTGTGTGTAGCTAAATCATATACAGGGTCACAGTAATGGGGGTTTC-
 GGGTGAGGTGATTCAGGTCTTCTGCTACAACCGGTTTTTCGTTCACTGGAGTCTCAGGTGAACGACACATCGATTAGTATATTGTCCCAGTGTCAATTACCCCCCAAAG-

K V E Q H T A C H C S T C Y Y H K S *

AAAGTGGAGCAACACAGCGGTGCCACTGCAGTACTTGTATTATACAAATCTTAAGGTACC-3'

TTTCACCTCGTTGTGCGCGACCGTGACGTCATGAACAATAAAGTGTAGAAATCCATGGCCTAGGTAGAGTTCGATTAGGCCT-5'

(KpnI) ggtaccggatcc (BglII)

FIG. 17B